Computer-Assisted Nursing Anticoagulation Case Management

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The purpose of this research was to demonstrate improved patient care process when nurses case manage patients using a computerized patient record. Early in 1990, the nurses in our outpatient internal medicine practice began to case manage patients being anticoagulated with Coumadin®. Using medical query language (MQL®), we developed a module for our computerized patient record - COSTAR®. The module allowed nurses to record indications for anticoagulation, flowchart laboratory and medication information, document care routines and telephone interactions. Since the case manager is identified for patients on the program, worklists and lab result lists can be generated from computerized reports on a weekly or daily basis.

A query of the master file found 138 anticoagulation patients followed by the case managers. We selected 32 patients from this population who had at least five outpatient International Normalized Ratio (INR) levels before and after nursing case management was initiated. This permitted a modified crossover study design that allowed the patient be used as their own control. The study group consisted of 18 females and 14 males ranging in age from 33 to 86 years with an average age of 61.5 years. Case reviews demonstrated ten different indications for anticoagulation. The group had been followed for a total of 155 patient-years.

We analyzed the COSTAR record for: 1) drops in hemoglobin of one gram or more, and 2) the frequency of INR values within the therapeutic goal. The results of our analysis are shown in the table below. There was no significant difference in the frequency of hemoglobin drops. The INR was within therapeutic range 32% of the time before case management and 39% after case management was initiated. This was statistically significant at the $p < .0001$ level, $\chi^2 = 19.36$ df$=1$. We recomputed the patient data, calculating the number of days that the patients were within therapeutic range. We found that before the patients were case managed 45% of the days the INR was within range, while afterwards this increased to 52%. This was statistically significant at the $p < .0001$ level, $\chi^2 = 253.9$ df$=1$.

We conclude that a computer module to assist a nurse in anticoagulation case management can improve the accuracy of management decisions and therapeutic control. Our data set had insufficient power to demonstrate an improvement in patient outcome.

COSTAR and MQL are registered trade marks of the Massachusetts General Hospital.

Outcomes	Finding Before Case Management	Finding After Case Management	χ^2
Hemoglobin Loss $\geq$ 1 Gram	1,863/10,000	1,723/10,000	NS
Number of INR within Therapeutic Range	32%	39%	$p < .0001$
Number of Days INR within Therapeutic Range	45%	52%	$p < .0001$

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